DOCUMENT RESUME

ED 165 922 RC 011 043

AUTHOR English, Janice
TITLE Snowshoeing!
PUB DATE 78
NOTE 35p.; Not available in hard copy due to use of colored ink

EDRS PRICE MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS *Activities; *Construction (Process); Design; Elementary Secondary Education; Equipment Manufacturers; *Guides; *History; Illustrations; *Interdisciplinary Approach; *Outdoor Education; Safety; Scientific Principles
IDENTIFIERS *Snowshoeing

ABSTRACT

Designed for use at either the elementary or secondary level, this guide to snowshoe instruction provides teachers and students with background information, proper care instruction, and various methods of use. Emphasis is placed upon an interdisciplinary approach to outdoor education and winter studies. Illustrations and photographs enhance opportunity for detailed instruction re: the snowshoe's history, design, care, construction, manufacture, use, and basic scientific principle. Additionally, this guide includes snowshoe activities and safety instructions. A list of snowshoe manufacturers located in the United States and Canada is also provided along with a 10-item reference list that includes one film. (JC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

SNOWSHOEING!

ED165922

PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Lloyd Fraser

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

RC 011043

2

The Board of Education for the Borough of North York

Outdoor Education Department

Snowshoeing

Introduction

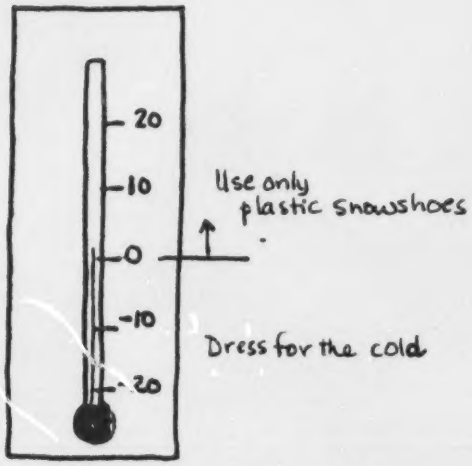
This booklet has been printed for North York teachers with the permission of the Waterloo County Board of Education from whom the original was obtained. Some changes and additions have been made to the original text in order to update the information.

Snowshoeing provides us with a good source of exercise and a chance for outdoor recreation. As a learning experience, an integrated study of snowshoes explores - its history, its care, its design, its construction, its manufacture, its use and its scientific principle. Also, a variety of outdoor winter studies can be enriched by the use of snowshoes (method of transportation).

Before taking your class outside to use snowshoes, it is necessary to develop a program of instruction. This booklet gives teachers and students some background information, proper care instructions and various methods of use. Often, the "put them on and try it" approach to snowshoes lacks any direction to education and causes dislike and misuse of the snowshoe. The child's time on snowshoes should be an enjoyable learning experience.

Janice English
Outdoor Education Resource Teacher

Snowshoe Weather



Snowshoeing, as with cross-country skiing, depends on the snow and weather conditions. It is important to remember these following conditions:

1. If the temperature is above 0°C, only plastic snowshoes should be worn.
2. If it is raining, freezing or not, only plastic snowshoes should be worn.
3. If the snow is ice covered or very crusty only use plastic snowshoes.

2.

CONTENTS

	Page
Teaching Snowshoeing	5
Construction of Snowshoes	7- 8
Easy Harnesses to Make	
Proper Care of Snowshoes	9-11
Snowshoe Repairs	
History of Snowshoes	13-17
Do You Know How To Dress?	18-19
Trips For Walking On Snowshoes	21-24
How Safe Is Ice?	
Trail Guide	25
Activities on Snowshoes	27-28
Manufacture of Snowshoes	29
Snowshoe Makers	30
References	31

TEACHING SNOWSHOEING

A. Classroom

1. Snowshoe Construction
   Examine a snowshoe carefully to see how it is constructed.
   Write a description of it for someone in another country where snowshoeing is not done.
   Read the article of the manufacture of snowshoes.
   Let the students discuss how they might make improvised snowshoes from materials found in the woods if they became stranded. (Refer to notes on "Construction of Snowshoes", pages 7-8.)
   Investigate the manufacture of snowshoes. (Refer to notes on "Manufacture of Snowshoes", page 29.)

2. History of Snowshoes
   Answer questions after you have finished. i.e.
   - Where did the use of devices to aid travelling on snow begin?
   - How did the devices spread?
   - What modern day devices did they become?
   - How did snowshoes come to North America?
   - What Indian tribes did the most to improve snowshoe styles?
   - Why did the Eskimo not find snowshoes necessary?
   - What devices did the Eskimos develop?

   Trace the spread of skis and snowshoes from their origin in Central Asia on a world map.
   Examine the National Geographic Issue of December 1972 and study the map of Indian tribes. Locate the homeland of some of the tribes mentioned in the section on snowshoe design.

3. Discuss proper care and protection of snowshoes and reasons for the procedures that are recommended. (Refer to notes on "Proper Care of Snowshoes", pages 9-11.)

4. Discuss the adjustment of the bindings to fit the boot before you go out in the cold. Failure to adjust the bindings properly is the greatest cause of breakage.

5. Discuss the various types of winter clothing and go over tips on how to stay warm in the winter.

B. The Actual Experience on Snowshoes

Using snowshoes will provide children with an educational as well as enjoyable experience. The student develops an understanding of how and why they are used and how to take care of the snowshoes. Follow the learning progression of walking on snowshoes. (Refer to "Tips for Walking on Snowshoes" pages 21-24.)

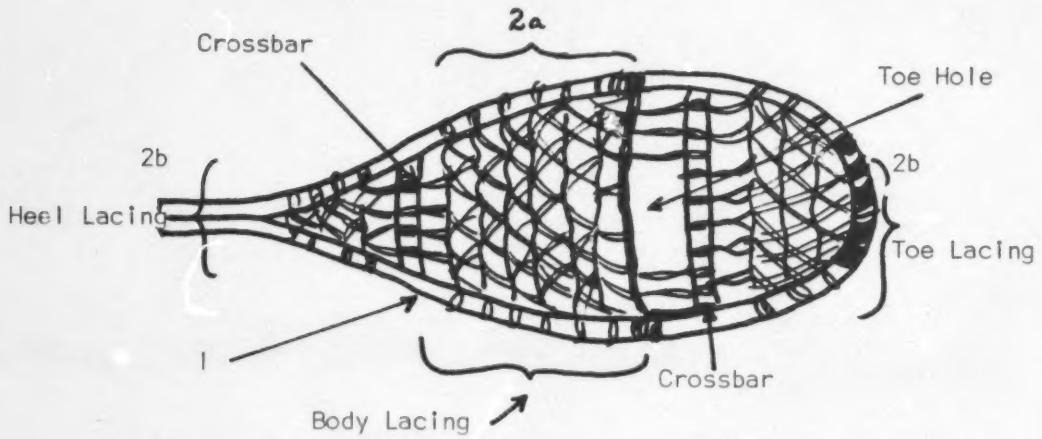
HOW DOES A SNOWSHOE HELP YOU STAY ON TOP OF THE SNOW?

Snowshoes distribute the weight of your body on top of the snow over a larger surface area so that less pressure is exerted on the snow in any one spot.

Your class can compare the surface area of an everyday shoe to that of a snowshoe. To do this, draw around your shoe on cardboard then cut it out. Weigh the cardboard shoe - how many grams? Divide this weight by the weight of a square centimeter of cardboard. e.g. First find the weight of 100 square centimeters of cardboard and divide it by 100.

The results will give you the surface area of one shoe. You must then multiply this number by two, for your two feet. Next, find the pressure that you exert on the snow (in grams per square centimeter) by dividing your weight in grams by the surface area of your two feet. Follow the same procedure with a pair of snowshoes and compare the difference.

CONSTRUCTION OF SNOWSHOES



1. FRAME

This is usually made of a stright-grained white ash which is a strong, light wood.

The wood is soaked and steamed, then bent to shape around a form. The wood maintains this new shape when it cools and dries. To prevent the wood from changing this new shape, a coat of varnish is applied to keep out any moisture.

2. LACING (or WEBBING)

This part of the snowshoe provides the platform on which you walk. The lacing is usually made of rawhide, an untamed animal skin. The skin is dried to prevent decay, and then it is soaked and stretched onto the frame. It shrinks as it dries, making a very firm base on which to stand. Then the lacing is varnished to prevent any stretching because of moisture.

a) Body Lacing (or Central Webbing)

This section of the lacing is made from thick pieces of rawhide. The lacing is usually wrapped around the frame, and provides sufficient strength to support the weight of the snowshoer.

b) Heel and Toe Lacing (or End Webbing)

Very thin strands of rawhide are used in these portions of the snowshoe since there is not too much strain in these sections. This thinner lacing is chosen for its light weight and flexibility.

** Some people think beaver skin makes the best rawhide for the lacing. However, the fur of the beaver is so valuable, it is not practical to be used for the snowshoe webbing.

3. Harness or Binding (not illustrated)

A soft, oiled leather is usually chosen for the binding. Lampwick can also be used. The binding must be flexible enough to conform to the shape of the boot of the snowshoer.

EASY HARNESSES TO MAKE (simple and cheap)

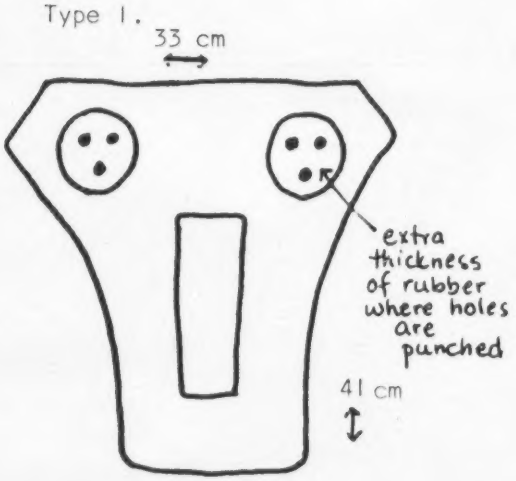
Squaw Harness

Pull lampwick around gut at back of the opening.
Make a loop large enough for length of foot.
Tighten around toe.
Cross lampwick over toe.
Pull the ends underneath the lampwick at each side.
Pull tight
Cross over toe again.
Tie behind heel.

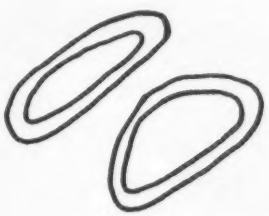
Harness from Inner Tubes

Make a good harness from inner tubes.
Follow the pattern below.

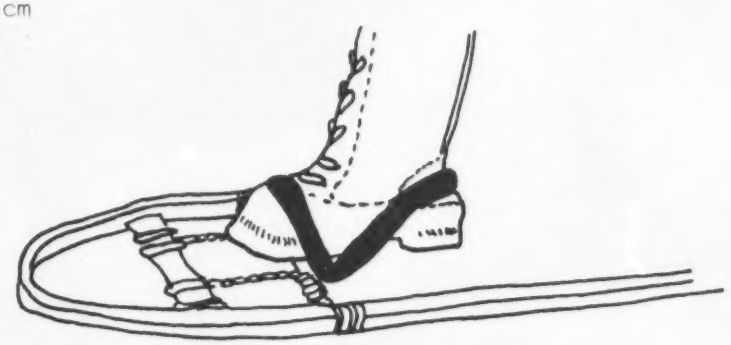
Type 1.



Type 2.



2 strips of inner tubing
- 1 for toe strap
- 1 for heel strap



8.

PROPER CARE OF SNOWSHOES

White snowshoeing makes an interesting addition to the school program, it can become very costly if the equipment is not used in the proper manner. A pair of snowshoes with harnesses costs from $18.00 to $35.00 at wholesale price and are in short supply. Therefore it is essential that staff and students know how to take proper care of the snowshoe and are aware of how to put them on and use them properly.

*** PLEASE read the following instructions and make every effort you can to minimize the damage and wear to the snowshoes.

A. Receiving and Shipping Snowshoes (bookings made through Forest Valley)

The set of snowshoes will arrive at your school via the board courier service (you must requisition the pick-up and return delivery). The snowshoes will be tied in bundles.

Please evaluate the conditions of the snowshoes when you receive them. Check for the following:

1. Broken or cracked frames or crossbars.
2. Condition of rawhide webbing. There should be no broken strands and the rawhide should be well coated with varnish. Unprotected rawhide will stretch and tear with very little use.
3. The bindings (or harnesses) may have missing buckles or broken straps.

REPORT ANY PROBLEMS TO FOREST VALLEY: 630-6263.

It is often possible to repair frames if we get them before the damage is too extensive. Snowshoes can be redipped in varnish to give them the protective coat they need. Bindings can be repaired if we get all the parts. i.e. straps, buckles, etc.

SHIPPING

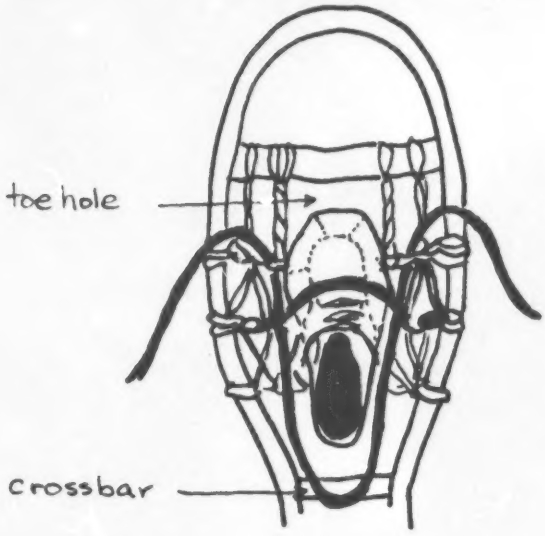
The snowshoes must be tied in bundles ready for shipping by 9 a.m. Please place the snowshoes at the most convenient exit for the truck to pick them up.

B. Putting on Snowshoes

1. Footwear-Flat-soled boots, moccassins, mukluks, snowmobile boots are best or a boot with a broad flat heel. Never use boots which have a narrow or high heel as they will break through the webbing.

2. Always put the snowshoes on in the snow. The protective varnish on the rawhide webbing will wear off on floors, on pavement, or on ice.

3. Adjust the bindings (harnesses) properly. Insert the foot in the harness so that the toe of the boot can move up and down in the toe-hole. The toe should be 5 cm behind the front crossbar. If the toe rests on the crossbar it will break the wood and cause the user to trip.



The harness strap can be adjusted and tightened to prevent the toe from coming too far forward when the user begins to walk or run. If the foot still comes too far forward, move the harness further back behind the toe hole.

Then adjust the strap around the heel as tightly as possible so that it will not slip off. When tightening this strap, raise heel off webbing for best results. On some models there will be a third strap over the instep and this can be adjusted to hold the snowshoe on the foot.

C. Preventing Damage and Breakage

1. DO NOT USE SNOWSHOES ON FLOORS, PAVEMENT OR ICE. These surfaces will wear the protective varnish off the rawhide webbing and rub the leather harness on the wooden frame.

2. DO NOT BRIDGE THE SNOWSHOES ACROSS LOGS, SMALL BRANCHES, GULLIES, DITCHES, etc. If the snowshoe has to support your full weight, it will snap the thin frame.

Pressure here breaks the frame.

Pressure here breaks the frame.

3. CROSSING FENCES. It is safer to take the snow shoes off or look for an opening to walk through.

4. Do not use snowshoes when the surface snow is crusty or ice-covered, extremely wet or a very light covering of snow. Wet snow will make the gutting mushy and unusable.

D. Care After Use

1. CLEAN all the snow off the snowshoe WITH YOUR HANDS. Banging the snowshoes together chips off the varnish. The less snow that melts on to the lacing, the longer it will last.

2. DRY the snowshoes, standing up, in an area where the temperature is about 15°C.

3. STORAGE. Stand or hang the snowshoes up so the melted snow can drip off. NEVER PUT SNOWSHOES IN A PILE as the melted water merely drips from one pair to another.

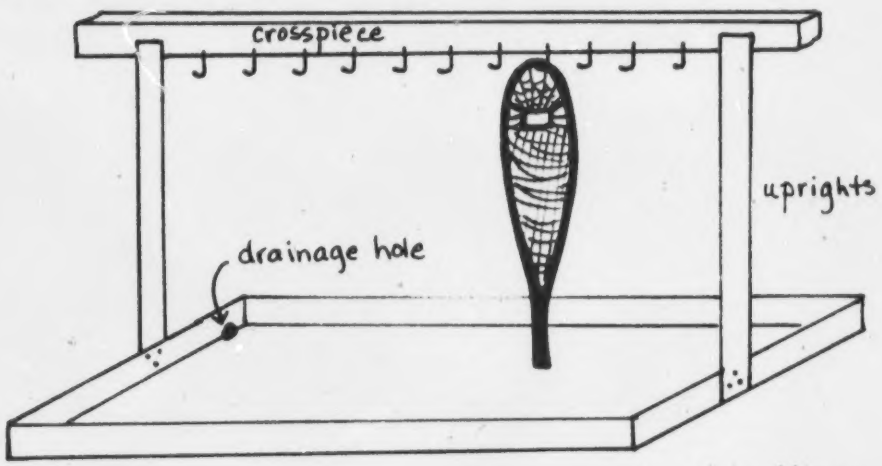
E. ANY STUDENT WHO DOES NOT TREAT THE EQUIPMENT WITH PROPER CARE SHOULD LOSE THE PRIVILEGE OF USING IT!

SNOWSHOE REPAIRS

As the winter season draws to a close it is time to take stock of the conditions of your snowshoes. Usually this means repairing broken shoes if possible and applying a coat or two of varnish. One method which has been successful in applying varnish is to build a dipping tray out of wood with sizes of 150 cm x 60 cm x 10 cm depth, (inside dimensions). Drill a hole in a bottom corner and find a cork to fit the hole snugly. At each end, in the middle bolt two uprights about 160 cm. long and a 5 cm x 5 cm cross piece to join the upright supports over the open tray. Secure 10 large screw hooks into the cross piece, equally spaced between the uprights.

Fill the tray with varnish to a depth 6 cm and place the snowshoe in the tray. Use a brush to splash the varnish over all sections of the snowshoe. Lift the snowshoe out and hang it to drip from the hook into the tray.

When finished lift up one end of the tray, remove the cork and drain the excess varnish back into the varnish can.



John Aikman
Council of Outdoor Educators
of Ontario Newsletter

HISTORY OF SNOWSHOES

by Don Morrison & Helen Lambke

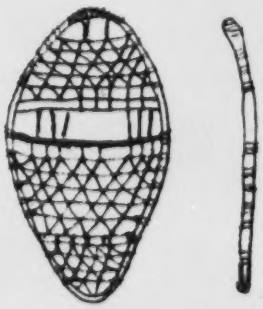
Early History

As far as archaeologists have been able to determine, the use of devices on the foot for easier travel over the snow originated in Central Asia about 4000 B.C. As people migrated northward from Central Asia into Siberia and Scandanavia, these devices became most important for winter travel and they were improved in design. The groups migrating westward into Scandanavia developed skis as a means of winter transportation. Eventually people migrating eastward through Siberia crossed a land bridge into America at a point where the Bering Strait is now found. This eastward migration bridge became the dividing point between the use of snowshoes and skis. The aboriginal peoples of North America (Indians and Eskimos) favored the snowshoe for winter travel and there is no evidence that they ever used skis. Therefore, the use of snowshoes in Canada came from the Indians who migrated here from Asia thousands of years ago. Meanwhile, skiing became very popular in Scandanavia and spread to other countries in Europe. Eventually, skiing came to Canada with immigrants from Europe, particularly those from Sweden, Norway, and Finland.

Indians and Snowshoe Design

In America, the Indians were the great innovators in snowshoe design as they lived in the forest temperate zone where snowshoes were necessary for getting around in the wintertime. The Eskimos, who lived in the tundra region did not find snowshoes necessary for they travelled mostly on ice or wind-packed snow. The Indians which did the most to improve the original snowshoe design were the Algonquins of the Ottawa and St. Lawrence River valley areas and the Athabascans in the western regions of Canada and the United States.

Bear Paw Design (Salish design of Western Canada)



The bear paw was the basic design of snowshoe. A single piece of willow was drawn into a round or oval shape by a webbing of thongs and usually braced with one or two cross-members. This design could be made quickly when the need arose as very few lacing materials were required. Bear paws are ideally suited to hilly areas and wooded areas where you must turn frequently.

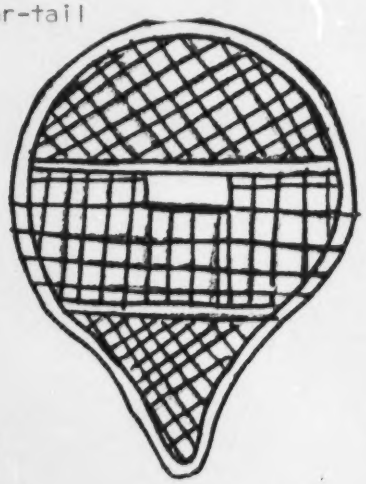
Other names are: Green Mountain & Modified Bear Paw

Adaptions of the Bear Paw Design

Gradually, each tribe or group of Indians developed different shapes and sizes of snowshoes to accommodate the snow conditions in their area. As a result, certain snowshoe designs became characteristic of different regions of North America. In fact, some tribes had several designs, each suited to a particular kind of snow - light and dry, granular, hard, soft and wet.

The following are some of these adaptations.

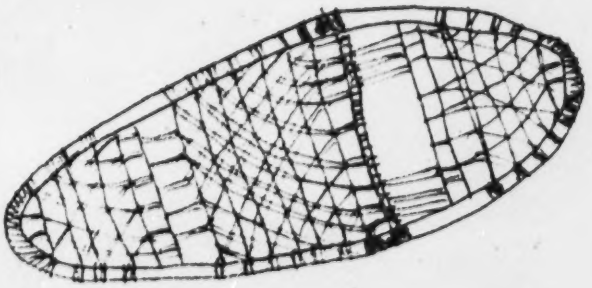
Beaver-tail



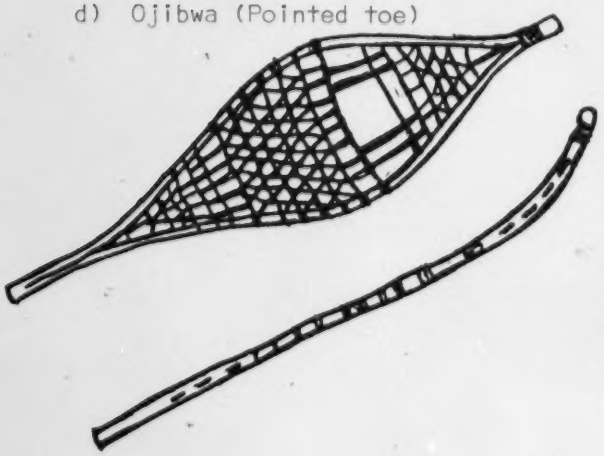
The Beavertail is an early adaptation of the Bear Paw and was found mainly in the Labrador Peninsula. The short tail helps make it easier to turn the snowshoe and this was very helpful in travelling in wooded areas. It is best suited to snow which is light and powdery.

Otter Trail

The Otter Trail retains the oval shape of the Bear Paw but is longer and narrower. It does not have a tail and although more difficult to turn is better for soft, deep snow and travel in open areas.



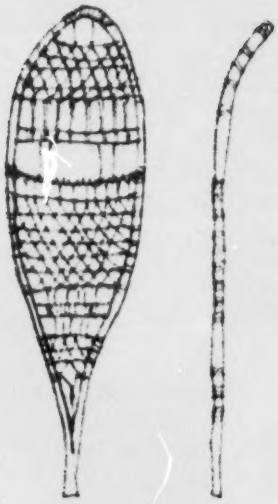
d) Ojibwa (Pointed toe)



The Ojibwa style of snowshoe is made of a two piece frame. One has a pointed toe and heel formed by lashing the frame members together laterally. The other has a spliced and rounded toe and a pointed heel. They are both long and narrow and are turned upward in front.
The pointed toe helped to break through crusty snow.

Other name: Cree

Algonquin



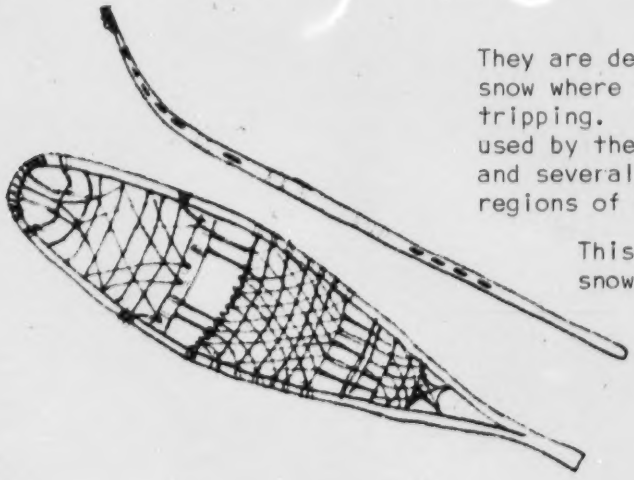
The Algonquin style of snowshoe has a one-piece frame which was pointed at the heel and braced with one or two cross-members. The toe was rounded or square and often was turned up to prevent tripping. The style was used by Indian tribes in the region which is now Southern Ontario and New York state. The extended tail made it easy to turn in the wooded homeland of the Huron and Iroquois nations.

This type is best suited to trails and open wooded areas.

Other names are: Huron-Iroquois, Abnaki, Michigan, Maine

N.B. Most of the snowshoes available for loan to schools from the Outdoor Education department are of this design.

Round Toe Pickerel



They are designed for use in crusty snow where the turned up toes prevent tripping. This design was commonly used by the Ojibwa nations, the Crees and several tribes in the western regions of North America.

This type is best suited for deep snow on trails and open areas, not in woods.

Other names are: Alaskan, Trail & Yukon

Plains Indians

The Plains Indians were reported to use long narrow snowshoes, often five to seven feet in length, in order to travel over the soft, light snow of the cold plains region. These snowshoes enabled the Plains Indians to hunt buffalo in the winter.

SNOWSHOE DANCE TRACKS

After the first snowfall close to an Indian village, the explorers would find a circle tramped in the snow by many snowshoes. In the center of this circle stood an upright pole. These tracks were made by dancers to celebrate the coming of the first snow. This was called the Snowshoe Dance.

The Indians were aware of the pleasures as well as the terrors of winter, and they knew how dependent they were on snowshoes to help them travel and hunt in winter. So the Indians danced around a pole upon which snowshoes hung. They were able to give thanks to the good spirits who gave them the snowshoes and for good medicine in safe and speedy travel.

The White Man and Snowshoes

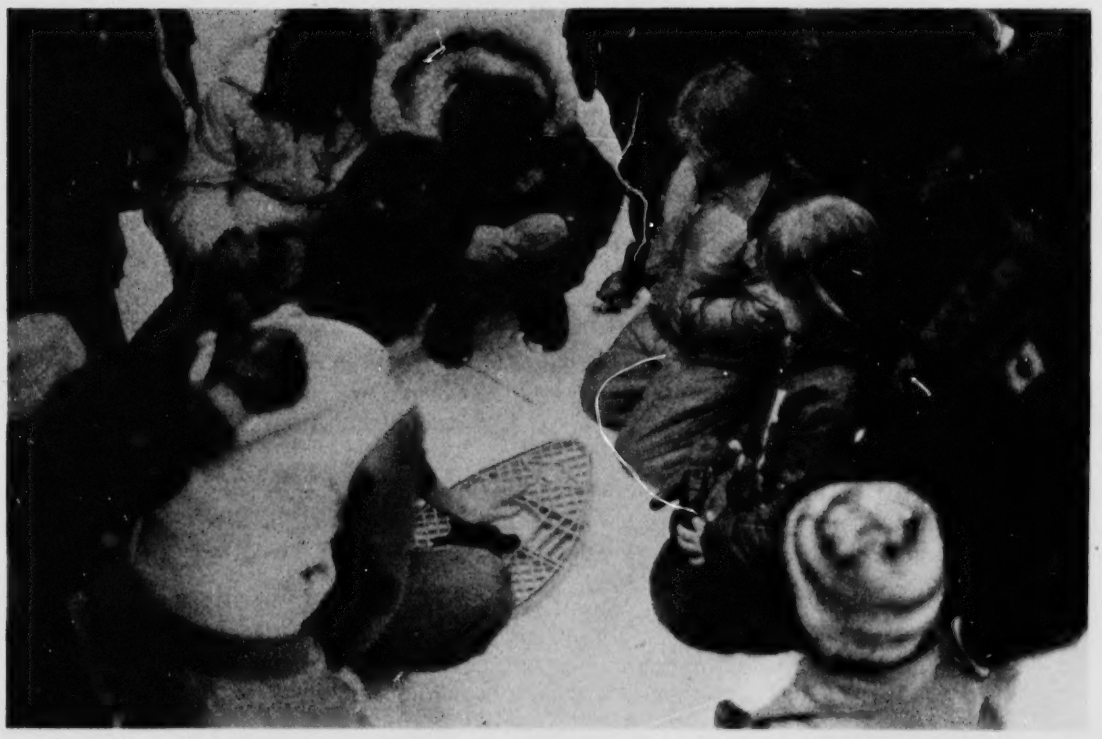
The French who settled in the St. Lawrence River area in the 1600's were probably the first white people to make extensive use of the snowshoe. The French tended to intermingle with Indians more than the English did, and as a result quickly learned how to make use of inventions from Indian culture such as the snowshoe, canoe, and tobbogan. During the prolonged struggle between the French and English for dominion in North America, the French and their Indian allies used the snowshoe to advantage in making raids on unsuspecting English villages. Gradually, the snowshoe became a basic part of every soldier's equipment. Trappers, hunters, explorers, surveyors, and early settlers in Canada found the snowshoe a necessity for winter travel.

Later in Canadian history, snowshoe clubs became very popular. The origin of these clubs date back to the time when military regiments formed teams and organized snowshoe races for competition and the development of physical fitness. Later civilian clubs were formed and each club had its own colourful toques and sashes. One of the most active of these clubs was the Montreal Snowshoe Club founded in 1840. These clubs organized races, evening hikes, and longer weekend outings. Such snowshoe clubs were much more common in Canada than in the United States.

In 1907, twenty-two clubs joined together to form the Canadian Snowshoer's Union which remains today as the largest organization of snowshoers in the world. This organization continues to manage snowshoe races and strives to maintain the historical aspects of snowshoeing. Mr. and Mrs. Raoul Charbonneau at 4595 rue St. Laurent in Montreal are very much responsible for keeping this organization alive and can be contacted for further information. Mr. Charbonneau hopes that one day, snowshoeing will become part of the Winter Olympics. At present, the Canadian Snowshoer's Union has over 5,000 members.

In the past few years the sport of snowshoeing has greatly increased in popularity. There has been a great demand for snowshoes. In addition to the traditional wood frame varieties many modern variations have been developed. Aluminum and magnesium frames have been used instead of wood. Nylon fabric with heavy Neoprene coating is used for the webbing in place of the traditional rawhide. One new style is the plastic snowshoe made of polypropylene and cast as one unit. These are light-weight and fairly inexpensive and should increase the popularity of snowshoeing as a family sport.

Plastic
Design



Do You Know How To Dress?

A sure way to ruin a day spent out-of-doors, is to be cold. You must learn to take precautions against frostbite, windburn, and sunburn, and learn the best ways to conserve body heat. The following suggestions will give you a good start to going outside on a winter day.

Clothing

- Dress for warmth and do not be concerned with style.
- Several layers of light wool shirts and sweaters are superior to a single heavy garment. If you become hot, you can peel off one or more layers.
  *Several layers also supply dead air spaces for better insultation. Remember that turtlenecks prevent ventilation at your neck when overheating.
- Two-piece suits of long underwear, the genuine net type with holes about 1 centimeter, are best for warmth.
  *This will be a ventilating layer next to your skin to allow the air to circulate. Avoid underwear that clings to your skin and lets the moisture from your body into your clothing.
- Pants should be made of a material that resists wetness and snow. Heavy wool pants are the best. Remember blue jeans absorb water, therefore the worse material.
- Outer clothing should be made of a material that will not collect fluffy snow, such as gabardine, poplin, or nylon.
  *This is your insulation and is the most important layer. Jackets with parkas, knitted cuffs, and drawstrings are excellent. They should reach mid-hip or lower and goose down or polar-guard are ideal fillers. Shirts should be tucked inside pants.
- To keep the weather out of your insulation, you need a windproof, water repellent outer shell.
  *Sometimes your insulating jacket has this type of outer covering or else an outer wind parka or raincoat can be used on top of your coat.
- Make sure you can move with ease.
  *Do not wear clothes that are tight or that bind.

Heads, Necks, and Hands

- A scarf is necessary to keep your face, neck, and body warm.
  *Wool is the best.
- Leather mittens with wool inserts are warmer than gloves because your fingers are together.
  *Both gloves and mitts should have long wrists to give protection against snow.
- If your head is uncovered your chances of being cold are greater.
  *About 25% of your body's heat loss occurs through the head, so keep it covered!

Footwear

- Dry, clean socks are essential.
  *Two pairs of socks will give maximum insulation. Wool socks with a thin pair of cotton or silk next to the skin are the best insulators. However, dirty wool socks lose their insulating qualities. Pant bottoms should be tucked inside socks.

- Boots must have a flat sole. Moccasins or a combination rubber-and-leather pack are best for snowshoes.
  **Boots must not be tight. If they are, your toes become cold. Prevent snow getting into the boot from the top.

Winter Hazards

**Travel in easy stages so that you do not become overheated. It is dangerous to perspire so much that your clothes become wet. Do not sit in the snow. Use a rock, log, backpack, or extra shirt to sit on. If snow gets on your clothes, brush it off before it melts.

**Frostbite is common to your nose, cheeks and ears. It can be avoided by holding your hands to the affected area, or wrapping your scarf around, or by wearing a knitted helmet and face-mask.

N.B. If frostbite occurs, first-aid procedure is to warm the affected portion very gradually with body heat. DO NOT rub the frozen section with snow. The body temperature should be brought up slowly and the frostbite victim should not be brought into a heated room or near a fire too soon.

**When spending a sunny winter day out-of-doors, be aware of the bright sunlight reflecting on the snow. Use an effective suntan oil or cream. Also sungoggles are essential for eye protection in winter snow activities.

Have a good, warm day outside!

19.

TIPS FOR WALKING ON SNOWSHOES
(learning progression)

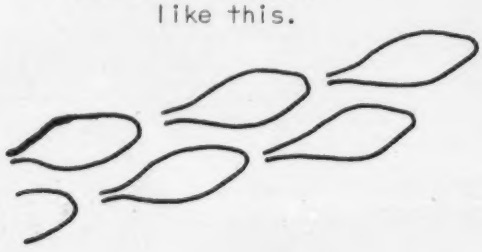
1. Select a pair of snowshoes which are the proper size for your weight.
   small.....up to 30 kilograms
   medium.....30k - 40k
   large.....40k - 60k
   extra-large....60k - 95k

   Adjust the bindings to fit your boots as directed in the notes on "Proper Care of Snowshoes".

2. Walk slowly at first, lifting the knees up a little higher than normal.
   Keep your legs comfortably together by lifting one shoe over the other rather than side by side.

Not like this.

Tracks should look like this.



   In deep snow, the knee lift is increased and must occur before moving the foot forward or you will catch the snow with the tip. Try to place the heel down first to keep the tips from becoming loaded with snow when in deep snow.

3. If you fall with your legs and snowshoes all twisted, simply roll up on your back and push your legs straight up in the air. The snowshoes drop into position where you can grab the tails with your hands and place the shoes under your seat. This provides a platform for getting up. In addition, a backward somersault will stand you right on your feet. As a last resort, you can take the snowshoes off to get back on your feet.

4. Running requires a somewhat similar technique to walking and lifting the knee first is important. This results in a bounding stride with the heel landing first rather than a normal running stride. A normal running action causes the tips to dig into the snow causing you to trip. Running should only be attempted after you are familiar with the snowshoes as it is the greatest cause of broken equipment.

5. To change direction on snowshoes, practice the following.

   a) "Clock Turn" (or "Step Turn"). Think of one snowshoe as the minute hand of a clock, the other shoe as the hour hand. Keeping the trails of the snowshoes as motionless as possible, rotate the front of each shoe (minute hand then hour hand, minute hand then hour hand, etc.) until you are facing the desired direction. This turn is useful in thick brush where it is not very easy to lift the snowshoes high off the snow. When the turn is completed, the tracks in the snow should look something like this.

You might call this a daisy turn.

   b) "Kick Turn" (same as in skiing). Pick up one snowshoe right off the snow and point it in the direction you wish to go. Then bring the other shoe around beside it. This is an easy turn to make however, it does not work well in dense bush. Poles will help maintain balance when practicing this turn.

6. Backing up on snowshoes can be difficult, especially in deep snow. The tails of the shoes usually dig in and you might wind up flat on your back. The trick is to first lift your knee up high and kick the snowshoe backwards. (The deeper the snow, the higher you must lift your knee.) This tends to flip the tail of the shoe up in the air, after which it settles nicely on the snow behind you. Repeat this with the other shoe and so on back and forth. If you can possibly turn around, a lot of time and effort can be saved.

7. To walk uphill, dig the toe of your boot into the snow to prevent yourself from sliding down slopes.

   In deep snow one can walk straight up gentle to moderately steep hills. For steeper slopes the following technique should be used.

   a) Traverse - On a traverse, one can make diagonal tracks across the face of the slope. On a wide slope the length of each traverse can be long. For narrow slopes, the traverses will be shorter forming a zig-zag pattern. Here step turns will be useful for changing direction of the traverse. Poles are valuable aids to balance especially when turns are required.

   b) Edging - On steep slopes many snowshoers find they slip downhill in spite of using the traverse. An edging technique with the traverse will reduce slipping. Swing the heel over toward the

uphill edge of the snowshoe and tramp down firmly at each step to create a 'step' on the hillside. This should be done particularly with the foot on the uphill side in order to reduce the difference in level between the two snowshoes. On a very steep slope it is necessary to create a 'step' or 'terrace' for both the uphill and downhill snowshoe.

c) Side step - In a very narrow steep slope it may be necessary to use the edging technique to make steps directly up the slope. The use of a pole on the downhill side would be very helpful in this situation.

8. Downhill travel is a good test of whether the bindings are tight enough as the foot will be forced father into the toe piece. If the toe strap is not tight enough, the foot will slide under the crossbar causing a fall forward.

a) Lean backwards - on moderate slopes, lean backwards and try to put pressure on the tails first.

b) Cords on the toes - Some snowshoers attach cords on the toes and can pull them with their hands to keep the toes up and force the weight back to the tails of the snowshoes as they descend.

c) Traverse - On steeper slopes, a downhill traverse reduces the steepness. Edging and the use of poles makes this technique even more effective.

d) Sliding - On narrow steep slopes one can slide down by placing one snowshoe in front of the other and sitting on the rear one. However, this gets snow on the clothing, causes the dampness that leads to rapid heat loss and consequent cold to the body.

9. Trail breaking on cross-country hikes, it is normal for snowshoers to travel in single file. The leader has the responsibility for trail breaking and since this is a tiring task, it should be rotated to a new leader frequently. The second person can help to make a smooth trail by not stepping in the tracks of the trail breaker by overlapping to pack down the rest of the snow.

10. When crossing

a) Gullies, ditches and logs - care must be taken never to put weight on snowshoes when they are only supported by the tips as the frame will break. Therefore, gullies, ditches and logs must be crossed by side-stepping over them rather than bridging the snowshoe.

b) Frozen bodies of water - extreme care must be taken to ensure the ice is thick enough to support the group. Spread the group out

over a large area and do not walk Indian file. If the thickness of the ice is questionable, it is safer to take the snowshoes off. To fail through ice with a pair of snowshoes on makes it extremely difficult to get back onto the ice surface.

HOW SAFE IS THE ICE?

(These figures are for clear blue lake ice.)
Loads must be reduced 15% for river ice.

Ice Thickness	Load
5.1 cm	Single person walking
7.6 cm	Group in single file
19.1 cm	Passenger car to 4.4 metric tons
20.3 cm	light truck
25.4 cm	medium truck to 3.2 metric tons
30.5 cm	6.5 - 713 metric ton truck
38.1 cm	9.1 metric ton truck
50.8 cm	
63.5 cm	
76.2 cm	63.7 metric tons
91.5 cm	100.1 metric tons

Slush ice loads are only 50% of the above figures.
Throughout the Spring use the slush ice load figures.

These loads ONLY apply to moving loads and not for parking.

Trail Guide

BEFORE

1. Gather a group for a travel party.
2. Choose a leader.
3. Assign one person to remain at the end of the group. This person will assist those in the group and prevent straggiers.
4. Examine and adjust snowshoes and their bindings.
5. Review the intended route.
6. Assemble emergency gear -
   map, compass, matches in a waterproof container, first aid kit, spare clothing such as mitts and socks, repair materials such as cord or lampwick for bindings, cord or wire for snowshoes, knife, whistle, length of rope, rations such as dried fruit, granola mix, tea, biscuits, etc.
7. Inform someone of your intended travel plans.

ON THE TRAIL

1. Take turns at trail breaking.
2. Check route finding.
3. Have rest stops.
4. Note landmarks for map reference.
5. Be prepared to turn back sooner rather than later, especially if someone is cold or showing signs of fatigue.
6. Avoid crossing over ice.

POSSIBLE HAZARDS

1. Getting lost.
2. Existing in the cold.
3. Breaking equipment.
4. Tiredness or injury.
5. Ice Crossing (See "How Safe Is The Ice?" page 24.)

ON RETURN

1. Inform someone of your return.
2. Clean off snow and store equipment.
3. If needed, repair equipment.

Things To Think About

1. The feet of animals -- How many feet touch the ground at the same time? What is the surface area of each foot? Which animals are better adapted for walking on snow and which are not?

Interesting examples of snow walking adaptations are the rabbit and the grouse. Snowshoe rabbits have hind feet similar in shape to snowshoes and enable them to travel easily over deep snow. In winter, the ruffed grouse grows a fringe of scales along the outer edges of its front toes. This enlargens the surface area of its feet so the grouse can travel easier over snow.

2. Would use exert more pressure standing on one foot instead of two? If you stood on ten feet, what pressure would you exert? What type of shoe would you exert more pressure - one with a flat heel, or one with a spike heel?

ACTIVITIES ON SNOWSHOES

1. Drawing or Writing in the Snow -
   Pictures of words can be stamped out in the snow with the snowshoes. One group can write out a message and the other group must read it.

2. Texture Rubbings -
   Inside, the snowshoes become interesting subjects for the study of patterns, textures and shapes.

3. Winter Nature Walk -
   Wearing snowshoes go for a walk and look for:
   a) examine the buds on the trees and shrubs;
   b) look for tracks;
   c) catch snowflakes and examine them;
   d) dig small holes in the ground, look for the layers of frost, ice crystals and hibernating insects;
   e) etc.

4. Cross Country Hikes -
   Initially these should be of shorter duration to allow the participants to develop some endurance. Later they can be extended to longer treks including a cook-out lunch. Tin-foil cooking for meals eliminates pots and pans. Moonlight walks involving students and parents are great. Group hike procedures should include two safety men at the read of the group and a trail breaker in front.

5. Winter Camping -
   More ardent snowshoers go camping in the winter. Care must be taken to have proper clothing, warm sleeping bags, and appropriate shelter. Winter camping should only be under-taken by those who have the knowledge and proper equipment. Beginners should be accompanied by experienced leaders.

6. Winter Carnival -
   Snowshoe races can be part of a winter carnival. Official competitions feature distances similar to track (100, 220, 440, 880, 1 mile and endurance races of 5 to 10 miles). Obstacle races including uphill and downhill sections, straw barriers, logs etc. are very popular. In some races, the competitors carry heavy packs full of camping gear. Team races can be run as relays and interest can be added by giving each team only one pair of snowshoes.

   Here are some examples of times from an official International Snowshoe Race

   100 yd - 12.1 sec.
   220 yd - 25.6 sec.
   440 yd - 51.7 sec.
   880 yd - 2 min. 49.0 sec.

7. Games on Snowshoes -
Many games can be adapted for snowshoes:
a) Follow the Leader - The leader can perform such maneuvers as: hop on one foot, run, roll over on the ground and get back up, walk backwards, etc.
b) Three Legged Race - One partner wears only the right shoe while the other partner wears the left shoe. Their other legs can be tied together and then they have to walk around on two snowshoes and a "third" leg in between.
c) Field Hockey - Played with hockey sticks and a volleyball.
d) Baseball
e) Tag
f) Novelty Races
g) Dodge Ball)
h) Compass Game)
i) Fox and Geese) Descriptions of these games
j) A Rough One) are found in The Snowshoe
k) Potatoes, Anyone?) Book.
l) A Hard One)

8. Orienteering such as: score
cross-country

9. Snow Drift Profiles -
Involves measurement, simple diagram graphing and warm clothes.

10. Initiative Tasks -
Snowshoes and a variety of equipment to help groups of children solve a problem.
i.e. Problem: You are trapped on a floating iceberg.
You have 3 pairs of snowshoes, 1 plank and 4 meters of rope.
You must get your team to shore without anyone falling into the -30°C ocean.

MANUFACTURE OF SNOWSHOES

Both the modern Indians and white men who manufacture snowshoes follow patterns which were in existence long before Europeans came to North America. Indian groups are still very active in the manufacture of wooden snowshoes. The snowshoes which our schools use are made in the little villages of Indian Larette and Village Huron just north of Quebec City. Here descendants of the Huron tribe have formed five companies which manufacture a variety of styles and sizes of snowshoes.

Examine a wooden snowshoe carefully and see how it is made. Naturally different styles will have been constructed in different ways. The Huron style snowshoe is manufactured as follows:

The frame is made of white ash which is selected for slow growth and straight grain. It is air dried rather than kiln dried to give it longer life. It is cut in strips of the appropriate thickness and length. These strips are placed in steam cabinets and gradually bent to take up the rounded toe shape and then the toe is curved upwards towards the front. Two wooden crossbars are fitted into slots in the frame so that they fit tightly. The edges of the frame and crossbars are rounded to eliminate sharpness which might cut into crusty snow. Holes are bored in the frame and crossbars for the attachment of the webbing. These holes are countersunk to eliminate sharp edges that might wear into the webbing. When you buy snowshoes, examine the frame carefully to see that the gain is regular, free of knots and flaws, and that the crossbars and holes have been properly made.

The webbing of the traditional snowshoe is rawhide; the skin of some animal with the hair removed. Rawhide is not tanned like leather but is dried for preservation, then soaked in water and cut into strips for the lacing process. The rawhide shrinks when it dries after lacing and becomes very taught. The lacing pattern generally produces a hexagonal effect. Thin strips of rawhide are used for the toe and rear sections and heavy strips for the centre section where the weight of the foot will be concentrated. The master cord around the toe hole has extra heavy construction as it takes the most punishment. It should be noted that many different lacing patterns are used in the construction of snowshoes.

After lacing has dried and become taut the snowshoes are dipped in waterproof varnish to coat both the frame and the rawhide. It is essential that this coating be kept on the snowshoes and it is very simple to refinish them. Once the protective coating is removed, the rawhide will soften and stretch, then tear, thus destroying a good snowshoe.

The most durable snowshoe has a lightweight magnesium frame and uses nylon covered metal cable for lacing. Snowshoes with aluminum tubular frames tend to crack where the wooden crossbars fit into the frame. They also have a webbing of thin rawhide which has been punched out by machines. This will tear very quickly if not properly covered with varnish. Synthetic lacing of nylon and Neoprene need not be varnished and appears to be more durable than rawhide. These factors should be considered before purchasing a pair of snowshoes.

SNOWSHOE MAKERS

The following is a partial list of snowshoe and snowshoe equipment makers in the United States and Canada. It is not intended as a complete list but merely as an up-to-date indication of the general distribution of these craftsmen in North America and as a good source of information about snowshoes. Snowshoes may also be bought and inquired about through the many excellent sporting goods stores and mail order houses in both countries.

UNITED STATES

Black Forest Enterprises
P. O. Box 1007
Nevada City, Ca. 95959

Iverson's Snowshoes
Shingleton, Michigan 49884

JKD Sports, Inc.
P. O. Box 1014
Boulder, Colorado 80302

Snowcraft Division
Garland Manufacturing Co.
53 Water Street - Box 71
Saco, Main 04072

Sportsmen Products
P. O. Box 1082
Boulder, Colorado 80302

Trappe of Aspen
Division of Woodstream Corp.
Lititz, Pennsylvania 17543

Vermont Tubbs, Inc.
18 Elm Street
Wallingford, Vermont 05773

Floyd Westover
Meco, Box 63, R. D. 1
Gloversville, N. Y. 12078

CANADA

Magline of Canada
Highway 17
P. O. Box 219
Renfrew, Ontario

Picard & Frere Enrg.
Village des Hurons
Province of Quebec

CANADA

Aigle Noir, Enr.
42 De La Passerelle
Loretteville, Province of Quebec

Avery & Sons
Whitney, Ontario

Bastien Brothers, Inc.
136 Est, Des Erables
St. Emile, Province of Quebec

Bastien Manufacturing, Enr.
Village des Hurons,
Province of Quebec

Big Chief Manufacturing Reg'd
P. O. Box 176
Loretteville, Province of Quebec

Black Eagle Reg'd
42 De La Passerelle,
Loretteville, Province of Quebec

Canadian Lacrosse Manufacturing
2440 Bonin Street
Sherbrooke, Province of Quebec

Chestnut Canoe Co. Ltd.
P. O. Box 85
Fredericton, New Brunswick

Faber & Company
P. O. Box 100
Loretteville, Province of Quebec

St. Charles River (Albert & Marcel Sioui)
Huron of Quebec
Village Huron, Quebec.

Teslin Snowshoes
Teslin Indian Band
Yukon

REFERENCES ON SNOWSHOES

Encyclopedia Canadiana. Toronto: Grolier of Canada, 1975.

Jaegu, Ellsworth. Tracks and Trailcraft. London: Collier-MacMillan Limited, 1969.

Jenness, Diamond. The Indians of Canada. Toronto: The University of Toronto Press, 1977, c 1932.

Ministry of Natural Resources, Leslie M. Frost Natural Resources Centre. Snowshoeing, Primer for Natural Resource Education.

Ontario Teachers' Federation Outdoor Education Committee. "Winter Activities Snowshoeing." Outdoor Education Manual - Part I. 1970. pp. 65-66.

Osgood, William, and Hurley, Leslie. The Snowshoe Book. Brattleboro: The Stephen Greene Press, 1975.

Permut, Susan. "Snowshoeing: Invitation to the Outdoors." Science and Children, February 1977.

Peterson, Gumar, and Edgren, Harry. The Book of Outdoor Winter. New York: Association Press.

"Quick Look at Snowshoes," Environmental Education Aid. Baldwinsville, 1976.

"Up, Down and All Around on Snowshoes." Outdoor Canada, January/February 1978.

FILMS

Available from the Board of Education for the Borough of North York

Snowshoeing (gen.) 1787
Treatment of Frostbite and Snow Blindness (jr.adult) 1476

"Snowshoeing gives us an opportunity to explore the outdoors throughout the winter months."

"Snowshoeing gives us a chance to explore the outdoors without disturbing it."

"Snowshoeing can be used as a means of access to snow covered fields and woods."

"Snowshoeing allows us to appreciate the quiet and the beauty of a snowy world."

Drawings by Janice Dargie

Photographs by Art Dorey
Tom Hill